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1867

Kimball and Company Philadelphia

KIMBALL & CO.,

Sole Manufacturers of

VULCANITE RUBBER

Artificial Limbs,

AND



DANIEL WILLIAMSON SKATING ON AN ARTIFICIAL LEG MADE BY KIMBALL & CO.

APPLIANCES

For every variety of

INJURY, DEFORMITY, OR WEAKNESS.

PATENTED AUGUST 18TH, 1863.

" MAY 23D, 1865.

" " 1ST, 1866.

APPROVED AND ADOPTED BY THE

U. S. GOVERNMENT AND

PRINCIPAL SURGEONS.

No. 639 ARCH STREET,

PHILADELPHIA.

SPANGLER & DAVIS, PRINTERS, 529 COMMERCE STREET, PHILADELPHIA.

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VULCANITE RUBBER

Artificial Limbs,

(ARMS AND LEGS.)

Moulded from Life in Form.

LEGS with ADJUSTABLE SOCKETS for fleshy stumps—LOCK-KNEE JOINT for short amputations of thigh—SLIGHT LATERAL MOTION IN ANKLE if preferred—CORRUGATED SIDE-KNEE JOINT for amputation below the knee. DOUBLE RECIPROCAL POINTS OF CONTACT, obviating the need of heel cords and relieving the joint-bolts of all the leverage of foot and lower limbs. All Sockets moulded over plaster casts stumps. See pages 6—8.

ARMS of full length with every movement of the natural arm produced by the will of the wearer, except the bending of the wrist joint. See page 18—24.

INSTRUMENTS FOR DEFORMITY, &c.

A Suspended Thigh Socket for Paralysis and Hip Disease.
An Extension Foot for Shortened Limbs. See page 14.

A Compound Radical Cure Lever Adjustable Pad Truss, warranted to fit, and not rust, &c., &c. See page 26.

Introduction to Circular No. 1.

In presenting our new invention to the public as an especial need of this age, we beg leave to offer a few remarks regarding the manufacture and use of Artificial Limbs. In tracing the slow progress of our difficult art, we find that Artificial Limbs have hitherto been made of a great variety of materials, such as iron, steel, brass, German silver, cork, wood, rawhide, &c.; often with a combination of several of the above named materials, and with all of which some serious objection has been found, on trial, either too weighty noisy, clubby, or too weak. Lately, best Artificial Limbs have been made of willow wood, a light porous wood very susceptible to perspiration or other moisture, and easily jammed or split. This wood is carved or shaped as near the natural form as gift of maker will admit, and are *at best but naturalized clubs*. More extensive still have been the mechanical appliances introduced, and numberless the kind of strings and ligaments used to bring natural manipulations, and which, while in some cases they for a short time may have performed the office intended, lacking the recuperative power of the natural limb, have very soon stretched and worn off, and thence become useless, and through this lack of nutrition and recuperative powers in all Artificial Limbs they become only machines to which the common principles of philosophy (*i e* of levers,) are alone applicable, for instance: We once had the privilege of enduring the tuition of the most famous self-styled Surgeon Artist to the Government for fourteen weeks, who, wearing one of said stringed instruments of his own make, (thence of course having the benefit of the best,) to our knowledge was obliged to remain in bed twice in said time to have his limb tuned to the playing of a slow march about his "studio." We learned this much, at least, while there, that if his was the best limb that could be made, every wearer should have, like him, a shop in his own house, always ready to keep him in walking order. By this we do not pretend to say that Artificial Limbs have never been made to answer a tolerable purpose, on the contrary, we are well aware that when amputations have been

favorable, and the wearer's power of endurance equal to the task of becoming accustomed to them, they have been made to answer for a short time. But in numberless cases, in trial after trial of them, they have been laid away as unbearable, and crutches or the old straight stick and socket, re-donned for comfort and safety; and that in more than a majority of cases they have only been borne by the most obdurate perseverance. And now, while we proceed to illustrate and explain our claim at improvement, we do not assert we can make an Artificial Limb that will entirely make good the loss of a natural Limb; but without the necessity of issuing "new rules for amputation, thereby suggesting the need of cutting flesh and bone to fit what we make. With confidence we claim that in *every case*, we can fit a Limb answering well the purpose for which it is intended, and which can be worn with ease and comfort; further, that in many cases where the stump is too sensitive to be borne upon, by other appliances, we can make them answer an equally good purpose.—*That we have made more than a step's advancement in the art.*

Having, as we said before, learned, at least, the need of something better than the best, we started in a new direction and, after long experimenting, we have at last succeeded in perfecting and patenting Artificial Limbs where exterior natural forms are moulded *in forms copied from life*, and the mechanical arrangements of which in the strictest sense anatomical, have applied the closest principles of philosophy of levers together with the nicest science of machinery.

Here let us say a word in regard to the nature of Vulcanite or hard rubber,, the material used for exterior forms. With most people the terms Caoutouch, India-Rubber, Gum-Elastic, Gutta-Percha, are synonymous, meaning a soft elastic substance perfectly impervious to moisture, with an offensive smell and becoming sticky with a small amount of heat, same as gum boots and shoes, while the above named substances are by no means the same. Vulcanite is entirely unlike either, being a compound having india-rubber as one of its component parts, which, when subjected to certain degrees of heat, becomes an entire different substance, not in the least effected by the

chemicals used in dissolving india-rubber. A hard, elastic tough substance, very much lighter than whalebone, horn, or ivory, *the strongest known substance of its weight, with less smell than ivory*, unaffected by cold or heat at less than 240° F., yet mouldable into every conceivable form and shape. It will occur to every thinker that this substance is wonderfully adapted to the manufacture of Artificial Limbs.

Introduction to Circular No. 2.

The preceding introduction was written nearly four years ago; then it was a new untried invention, now we present it as an established success. While progression has been our daily motto and we have labored assiduously and unremittingly to dig out all the minor faults necessarily attendant upon a new and so difficult an invention, we have nothing to retract from its strong language, but rather in the four years of unprecedented opportunity, in the universal satisfaction given, in the approval and adoption of the United States Government of all we make, Arms, Legs, and Appliances, (and this after all other Limbs had been tried and found wanting,) in the daily increase of our business, in the constant receipt of satisfactory testimonials, in all we but find strength of faith to say to our past and future patrons, we can do the best that can be done for you.

In consequence of the jealousy and well grounded fears of our competitors in business who have occupied their much spare time of late in circulating stories of the odorous, bad, unhealthy, friable nature of india-rubber, hard-rubber, &c., we beg leave to state a fact easily proven at any dentists office in the United States, that without doubt there are one hundred thousand persons in the United States who wear the same material as that of which our Limbs are made, in their mouths night and day without any bad results whatever, and furthermore such is the strength of said material, (Hard-Rubber or Vulcanite,) that each artificial tooth is fastened to the rubber

by only one minute platina pin its head imbedded in the rubber, and yet one tooth often bears the entire power of the jaws in biting. Now it does not take a very deep philosopher to infer from the above, that if persons can wear all the time said Hard-Rubber sucked air-tight upon the most sensitive membrane in their constitutions, they certainly may wear it next to or near their skin; the fact is there are few materials, (none perhaps except gold and platina,) that are so tasteless, seentless, and chemical proof as Hard-Rubber, and while we are on the subject of *smell*, allow us to say further, and every wearer of a wooden Limb will confirm our testimony, all perspiration that exudes from the body, contains more or less animal matter, (that from an amputated stump much more than common,) so that in case the socket of an Artificial Limb is made of an absorbant porous material like willow wood, it absorbs said animal matter, which entering into the pores of the wood soon sours and dries and being again dampened by perspiration until it almost becomes a mass of dead animal matter, often almost unendurable to the wearer.

In our Moulded Hard-Rubber Sockets the material is perfectly impervious to moisture, is lined with soft bueskin which absorbs the perspiration, and which can be easily removed after which wipe out the socket with a little whiskey or alcohol and your Limb is as sweet and clean as when it was new.

LEGS, FULL LENGTH.

We will illustrate the three most common varieties of Legs made by us, from a combination of which nearly all of our legs are made.

First, then, let us impress on the mind of the reader that commonly all the exterior lines, or lines indicating the artistic form, illustrate a shell made of Hard-Rubber, from a sixteenth to a fourth of an inch thick according to the strength needed. All these forms or sections of forms are moulded in moulds transferred from life with plaster-of-Paris. In both arms and legs all the fastenings of the joints are imbedded in the rubber when the forms are moulded and vulcanized.

Fig. 1. Illustrates the half of a full length leg divided through the ankle and knee bolts. (a) Is a socket moulded over a plaster cast of the stump of the wearer, suspended in the top of the leg. From the hole (b) to the top of the leg the exterior form and socket come to an edge and lap one past the other (see *Fig. 2.*) and around the top of the leg is a German silver band. (a *Fig. 3.*) Made to clasp at its ends and over-lapping the lap in the socket and therewith forming an *adjustable* socket. A bone or pitman connects the knee with the ankle joint and extends at the knee half the diameter of the leg past the knee bolt, over the upper end of which a hook (e) is so adjusted as to prevent the knee from bending only as much as is needed in walking, when said hook is raised the knee bends perfectly free. This hook is operated at the back of the limb (h *Fig. 2.*) making a lock-knee or not at the will of the wearer. It will be easily understood that this arrangement overcomes the fault, in other limbs, where the stump is short, of the knee giving out when walking on uneven ground. Another very important result is secured by extending the pitman beyond the knee-bolt, two opposite points of contact are produced (i-i) which relieve the knee-bolt and joint from the immense strain of the upper and lower portions of the limb acting as levers. The importance of this improvement will only be appreciated when it is calculated that often this strain, with a man weighing one hundred and fifty pounds, is nine hundred pounds. The upper end of the pitman is surrounded by a metallic band through which the knee-bolt passes, the pitman turning on the bolt and making a bearing of the end of the wood and metal, the best possible combination to wear. The knee spring is constructed on the plan of a double trigger lock spring of a gun, can be easily removed and replaced with a common screw-driver without taking the limb apart, said spring is suspended in an opening in the pitman (i *Fig. 1.*) below the knee.

The ankle joint is constructed on the same principle as the knee, the pitman extends nearly to the bottom of the foot (n *Fig. 2.*) finding in the heel the lower point of contact, in the instep the upper point, (k-k) the ankle bolt midway be-

Fig. 1

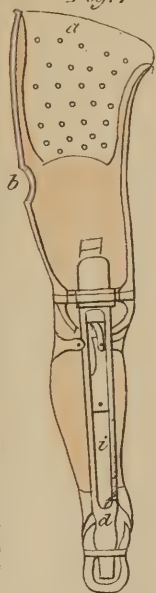


Fig. 2.

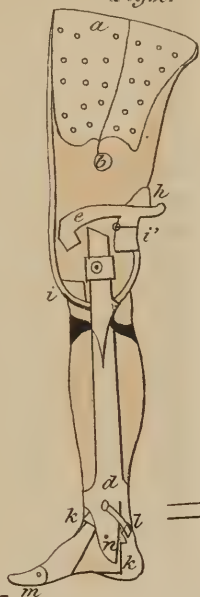


Fig. 4.

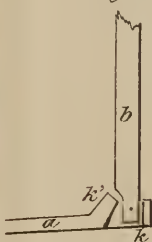


Fig. 5.



Fig. 7.



Fig. 7.



Fig. 8.



Fig. 9.

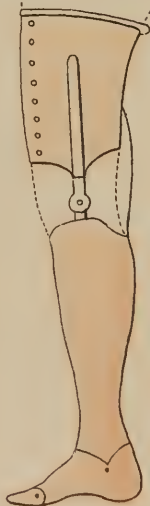


Fig. 6.



Fig. 7.



Fig. 7.



tween the two points. This arrangement does away with the need of a heel cord, (*the great sore in all wooden legs.*) The philosophical difference between our ankle joint and the ankle joint in which a cat-gut or cord is used, will be seen by comparing *Fig. 4* and *Fig. 5* (*a*) represents the lever of the foot and (*b*) the lever of the upper limb, as the weight of the body comes on the toe it would lift up on, (*a*) and in *Fig. 4* (our joint,) the strain of this leverage would be received at the opposite points of contact (*k-k*,) while in *Fig. 5* this leverage will pull down on heel cord (*c*) and lift up directly against the wearing surface of the ankle bolt, compelling it to endure not only the weight of the wearer, but the entire leverage of the foot; at least four times the weight of the wearer.

It must occur to every reasoner that these joints, so constructed as to never bear only the weight of the wearer, must be infinitely more durable than those in a leg constantly subjected to from six hundred to a thousand pounds strain. The ankle spring is placed between the pitman and the heel, (*l Fig. 2*) is duplicated to any extent and can be removed and replaced in a minute. The toe joint is formed by a wide metallic band (*m*) fastened in the toes and passing around a taper plug (*o*) which is fastened to the foot. The following case is extreme of its kind, but otherwise representing hundreds of cases:

Lieu't Hilton lost his limb in the U. S. Service, it was amputated three inches below the hip joint, so that it extended very slightly below the Perinæum. He could at any time without loosening the straps, lay his limb up against his head. He writes as follows:

ERIE, PA., *March 18th, 1866.*

Messrs. KIMBALL & CO.,

DEAR SIR:

I have neglected writing you for a long time for the reason that I wished to give your Artificial Limb a thorough and impartial trial, and now after having worn it and fairly tested all its advantages over other limbs for over a year, (he has tried other limbs,) I take the greatest pleasure in recommending it to my afflicted neighbors as the only leg in the States adapted to short amputations of thigh. It is now over a year since I have been on crutches, and I can now walk four or five miles easily—I do walk from two to three miles every day of my life. I frequently meet people

with limbs off below the knee who do not walk as well as myself, and I have never yet met a person with as short an amputation as mine, (three inches,) using an Artificial Limb. I think the limb you made me a model piece of mechanism, it has never been out of order. I have taken pains to examine all the different legs manufactured and do not hesitate to pronounce the one manufactured by you far superior for thigh amputations to anything that has yet been placed before the public.

I shall always feel very grateful for the extra interest you took in my case.

I remain, very respectfully,

Your humble servant,

JNO. C. HILTON,

1st Lieu't Veteran Reserve Corps.

Where the stump is sufficiently long to give the wearer a good government of the limb, the lock is not put in the knee.

LEGS BELOW THE KNEE.

In treating amputations below the knee, we make several variations in a way to particularly adapt the limb to the profession and habits of the patient. For instance, quite a light man who has an indoor, light employment, may get along very comfortably without carrying the weight of the steel side knee joints and a wide clasp around the thigh, (*a Fig. 6*) but in the majority of cases where the amputation has been performed between the ankle and the thigh, we make a clasp about nine inches wide, lacing around the thigh; (*a Fig. 6*) connecting this clasp with the limb below the knee are two steel joints (*b-b*) having a bending centre exactly in line with the centre of the natural knee. However, these joints may be crooked by different manufacturers their bending centres, to make a limb work perfectly, must in all cases be the same. The great fault with these joints previous to our invention, has been on account of the very short small bolt (*a Fig. 8.*) serving as a wearing service, allowing it to click at every step after a little wear. (*Fig. 7.*) represents the joint invented by us, called a corrugated joint, it consists of an extended circular head, (*a Fig. 7*) on one part turning in a corresponding depression (*a*) in the other, and on a solid piece (*b*) extending through the centre of the head. The great circular wearing surface of this joint precludes the possibility of a click. The socket in this limb

(*c* *Fig. 6*) is suspended in the exterior form. The pitman (*d*) adjusted to the foot the same as in (*Fig. 2.*) spreads in a V shape at the top, and occupies the space between the socket and exterior form and to which the side joints are riveted. (*Fig. 9*) shows this limb completed.

The following is from a patient who had a short and irregular stump below the knee, he had previously tried a wooden limb without success.

PITTSBURG, PA., Dec. 12th, 1865.

KIMBALL & CO:

MESSRS:

I received my leg a short time ago from you. The first time I put it on I could not exercise much on it and had a serious notion of returning it to you. The next day I improved and now can go around without a cane. I consider your patent a grand success over wooden limbs and I have forever discarded them. My leg fits splendidly, it has never hurt my stump since I put it on. I intend being in Philadelphia soon, when I will call and see you. I am gentlemen,

Very respectfully,

Your obedient servant,

J. SHARP WALKER.

In an amputation at the instep, side ankle joints (*a* *Fig. 10*) are used, connecting the part of a foot needed (*b*) with a laced clasp (*c*) around calf.

(*Fig. 11.*) represents an instrument for a shortened limb. It has an artificial foot (*a*) attached to a platform (*b*) the same as in an artificial limb, by a prong or pitman extending into and jointing in the foot. Said platform serves as a rest for the natural foot and to which is attached a shoe shaped clasp (*c*) to hold said foot in position. The platform (*b*) is varied in thickness to each case, depending on how much too short the natural limb is. From this platform two steels extend up the limb often only to the knee, (where the knee is strong enough to carry the weight of the body,) otherwise clear up to the body and to the top end of the steels, in either case a strong laced clasp (*d* *Fig. 11* and *12.*) is attached.

(*Fig. 12*) represents another instrument invented by us for for Hip-diseases, Paralysis and to correct deformities. It consists of two oval pieces of steel (*a* *Fig. 12.*) jointed together

by a pivot and fastened to the shoe under the hollow of the foot (*b.*) Two tubes are made to slide upon the upper ends of the steels, one end of each tube being securely pivoted to a socket (*d.*) fitting around the thigh of patient. In the upper end of these steels are drilled a row of holes into which a spring catch is fastened to the tubes and holds the two together, and making the instrument capable of five or six inches extension, at the same time making the upper socket suspended so that it will of itself find and keep its most comfortable fitting position. Often a lacing (*c.*) is adjusted to hold the knee front or back as the occasion requires.

This instrument is a species of crutch applied directly to the affected limb and is wonderfully adapted with its many variations, such as one, two, three, or more inches under the foot, an elastic strap used as a twister going around the limb spirally, as an attachment for straightening a limb, &c.

We have applied very many of these instruments to limbs injured by bullets, as well as to almost every variety of weakness or injury except amputations, and it has in every case been a perfect success. The following is a note from a lady in Philadelphia:

PHILAD'A, Dec. 21st, 1865.

Messrs. KIMBALL & CO:

GENTLEMEN:

I take pleasure in stating that for more than twenty years (during which time I had the best medical advice and attendance) I have not been able to walk without the aid of a crutch, and that too with great difficulty, until furnished with the appliance you designed for me. I can now walk daily long distances with ease. I will be glad to give further information to any who may call at

1213 GREEN STREET.

(*Fig. 13.*) illustrates a carriage invented by us for the treatment of paralysis of both limbs accompanied by contraction of tendons of the hip and thigh. This illustration shows a half section of the carriage including the entire castor wheel behind. (*a.*) is a cushion intended to come in contact with the breast of patient, (*b.*) a padded slide, sliding forward on the side pieces (*c.*) and made to catch in any position wished. Two pendulums are suspended from the front frame work, with small

Fig. 10.

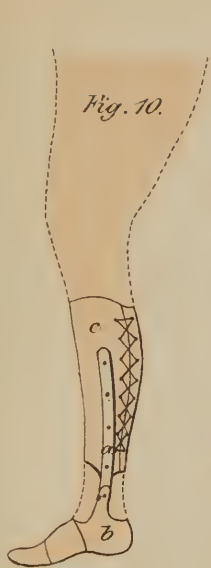


Fig. 11.

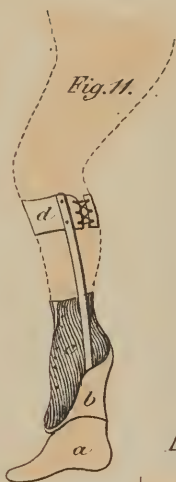


Fig. 12.

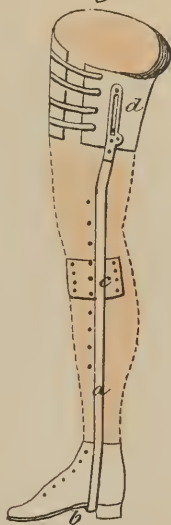
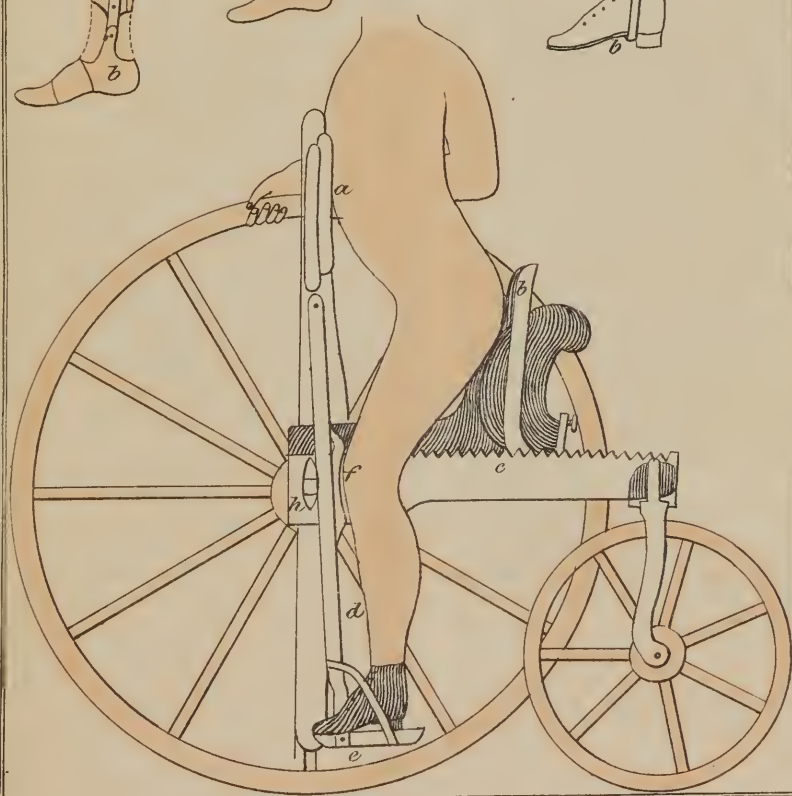


Fig. 13.



platforms (*e*) for the feet at their lower ends. Two cushions (*f*) come in contact with the knees. The pendulums are moved backward and forward by means of an ellipsis (*h*) attached to the ends of the axletrees extending from the large wheels through the side frame work, so that while the patient rolls the wheels, the act of walking is produced, at the same time pressure to any extent is applied to gradually lengthen the tendons, thus bringing back sensation, strength and symmetry. Mr. S. H. French 1001 Market Street, Philadelphia, will be pleased to answer any inquiries concerning this invention. This completes our illustration for the lower extremities and we proceed to illustrate.

ARTIFICIAL ARMS.

And that our patrons may understand that we appreciate our task in undertaking to replace an arm amputated near the shoulder and give it all the natural movements operated by the will.

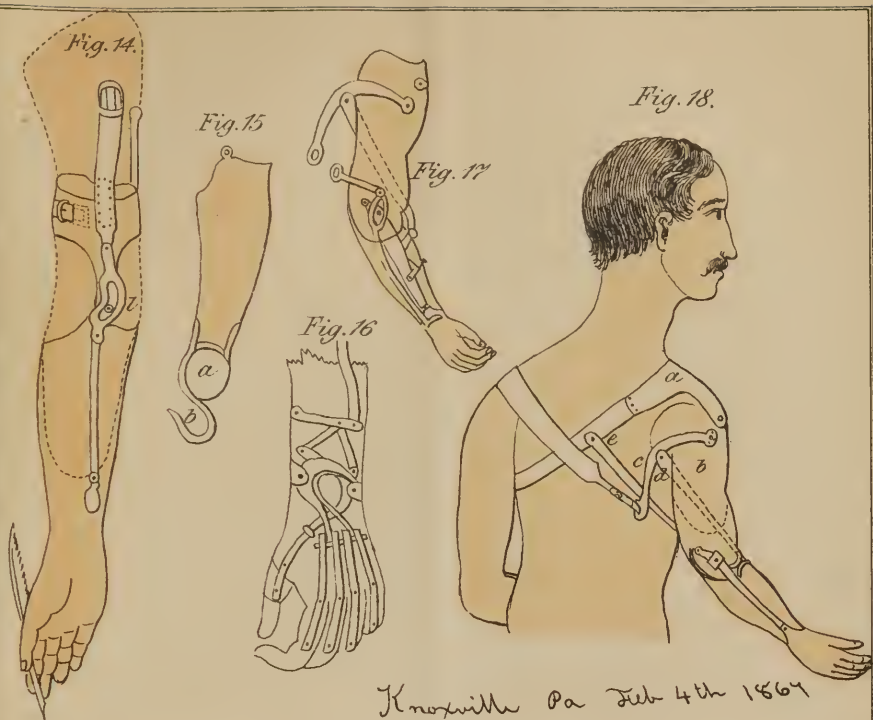
We copy from an article in Harper's Weekly, entitled the Human Hand.

"Even a philosopher is overwhelmed with astonishment when he reflects
 "with any degree of attention on the mechanical structure of the hand.
 "In the first place the frame of the organ, the bones entering into the com-
 "position of that member, is a master-piece of aggregate contrivances
 "which throw into the shade the most perfect contrivances of man in point
 "of combinations and efficiency. From the shoulders to the tips of the fin-
 "gers there are thirty-two distinct bones curiously articulated one with
 "another which it would seem impossible to imitate with any chance of
 "success, viz: one shoulder blade; one collar bone; one arm bone; two in
 "the forearm; eight in the wrist; five in the palm of the hand; two in the
 "thumb, and twelve in the fingers. Next, to move these thirty-two bones
 "in all the directions they were designed to act, there is a perfect labyrinth
 "of delicate cordage which when separated and distinctly displayed, show
 "that there are forty-six muscles, and some anatomists make more, to ex-
 "tend, bend, turn, clutch, unclutch, nip, squeeze and make all the move-
 "ments which we can give the arm and hand by simply willing to do so.
 "But in order that the mind may hold positive control over the thirty dif-
 "ferently formed bones by the forty-six muscles of which no two are alike,
 "there are long nerves running like telegraphic wires from the arm-pit to
 "the smallest fibre of every muscle. These nerves hold communication

“through the intervention of other nerves from the shoulder with the
 “brain. One set of nerves or rather telegraph cords convey messages to
 “the fingers and another set send back word to the brain of the reception
 “of the order and how the business is transpiring. Besides all these com-
 “plications, to nourish and keep the several parts vitalized, there are arter-
 “ies, veins, lymphatics, absorbants, exhalent tubes, and tissues almost be-
 “yond enumeration to keep the whole in running order. And when in
 “good condition what a power it exerts! It conveys an ineffable language
 “which even brute animals understand. It menaces, invites, repels or
 “gives character and grandeur to the expressions for a orator .It is a
 “hammer, a vice, a punch, a wrench, a lever, a pry, a force and a mighty
 “power by which the pyramids were reared, cathedrals called into being
 “from the hardest quarries, and all that is amazing, surprising, delicate or
 “calculated to advance civilization in art, literature and science is accom-
 “plished by those wonderful instruments,—Human Hands.

In trying to imitate the foregoing, we have only to deal with possibilities, sensation and recuperation are among impossibilities in anything man can make, and thence it occurred to us to undertake to make an Artificial Arm on the plan of anatomy would be absurd, for the reason that the cat-guts, ligaments or strings having no recuperative power, (*i e*) to grow as fast as they wear out, would very soon become useless from stretching and breaking; thence we soon changed our plan and undertook to bring about the same movements by imitating a lower order of animal creation, that is, the Lobster, or rather the Armadillo first by producing a series of Armadillo arranged shells by transferring impressions of natural arms to forms of Hard-Rubber, and second by so attaching the levers or bones as it were, to these shells and thence connect them to some moving power of the body so as to produce the manipulations of life, and we assure our readers, ours was such a success as to astonish every beholder; so quick, easy and natural were the movements of these arms, that we have seen the best Surgeons of Philadelphia pull up the coat sleeve of the wearers to be sure that the arms were artificial, at seeing two patients play toss and catch across the room.

The following cuts are taken from photographs of Chas. M. Butterfield playing the violin, eating, &c., and hundreds of people passing 7th and Arch Streets will testify to his playing



Knoxville Pa Feb 4th 1864

Mess Kimball & Co

Gents
 I recieved The hand last week
 The slight attoration you made in it makes it all right - is full small yet with the leather lining you sent - but with a silk lining it works perfectly and I think the stump will shrink to make the better mudfall after a little I have written the above with my left hand, this I write with my right-artificial is somewhat better The fork works first rate I can hold my food to cut it and carry it - to my mouth with ease & gracefulness equal to any left-hand excuse you may have difficulty in reading this but I am encouraged with this beginning
 Thankfullly & c D Angel.

well. He could eat and write as gracefully as any one. These are the only arms made in the world that make any professions to symmetry of form and where the *first same thought and motion closes the fingers at every angle of the elbow, the same as a natural hand*



(Fig. 18) is the best of our attempts to illustrate an applied full length arm back view. (a) is a strap attached to the arm and resting on shoulder, (b) the stump extending down into arm (c) a lever serving as a shoulder blade and to which the strap (d) is attached, this strap is attached to the front of the forearm so that an outward movement of the shoulder bends the elbow: (e) is a strap which passes through the elbow joint by means of a slotted lever, (l Figs. 14 and 17) and which is attached to levers moving the fingers. The movement of the fingers and thumb is not unlike a pair of forceps or pincers,

(see *Fig. 16.*) A rotary motion of the forearm and hand is produced by the shell of the forearm turning on the circular elbow joint. We do not expect from the above or any description we can write that the practical workings of this arm can be fully understood, it must be seen to be appreciated. We can only say, by the above simple means every movement of the natural arm is secured, except the bending of the wrist. The elbow is so arranged as to be locked at any angle, and the hand may in an instant be closed or opened. Its artistic beauty is only equaled by nature, weighs from one to two pounds, and costs from one hundred to one hundred and fifty dollars, warranted to fit perfectly and comfortably.



The following is from a wearer of its kind.

Messrs. KIMBALL & CO:

PHILAD'A, Nov. 1st, 1864.

SIRS:

Having lost my arm at the battle of Savage Station, June 29th, 1862, and having been supplied with one of Gildea's artificial Arms at Government expense, I tried to wear it sometimes but found it entirely useless, the fingers were of no use whatever, besides the arm was so heavy it was very painful to wear. I saw your advertisement of Vulcanite Rubber Limbs and concluded to try one immediately, which I did, and it has proved a

perfect success, it is far superior to anything I ever expected to get. My arm was amputated above the elbow and yet I can use the fingers and elbow for many purposes. I am satisfied it is the best thing made.

I remain Sirs, your humble servant,

JAMES HARRIS,

Late Co. B., 72d Regt., P. V.

ARMS BELOW THE ELBOW.

(*Fig. 14*) represents an applied Artificial arm below the elbow, the hand of this like those above the elbow, is operated entirely by the will without the aid of the other hand and on the plan of a pair of forceps, (see *Fig. 16*.) The fingers are so arranged that when the hand is closed they make a good hook for eating, writing, &c., the fingers and thumb are clasped together, so that with the assistance of a soft rubber ring, *any common knife or fork* may be used with ease and grace in eating, thence doing away with the need of taking off the hand, laying it down, and taking a fork from a pocket where it always has to be carried, sticking it into the wrist, trying to eat in an awkward way without a hand. We have had men come into our office, who, the first time trying, could take off their hats, and play toss and catch, write and accomplish a wonderful number of the difficult things to be done with natural hands. The lithographic *Fac-simile* extract from a letter written by a man who in the absence of his right hand had learned to write with his left, but in less than two weeks after getting his Artificial, writes us: (See lithograph.)

(*Fig. 15*) represents an instrument to use in the place of an Artificial forearm at heavy labor on a farm &c., with which the wearer can rake, hoe, mow, sweep, &c., it consists of a socket like that of a fore-arm, but in place of the hand a steel ring (*a*) is riveted, and on the front of the ring a strong steel hook (*b*) is fastened. Capt. Richardson, of Rochester, Vt., writes thus in regard to an instrument of this kind for an amputation above the elbow: "I can do all kinds of work on my farm, with the stump arm you made me nearly as well as when I had both arms."

An instrument for amputation above the elbow is constructed the same as (*Fig. 15*) except the socket is fitted to the shoulder instead of the forearm.

We do not propose to attempt to illustrate our apparatus for paralyzed and crippled arms and hands. We will only say that through a desire of the soldiers and surgeons in charge of Turners Lane U. S. Hospital for the treatment of these special cases, we had special authority from the Surgeon General, U. S. A., to treat them and charge to U. S. Government. Often an elastic strap or a slight splint properly applied will help a bad hand or arm wonderfully to perform its functions. Our last five years unprecedented experience gives us the assurance to say we can do all that is possible for such cases.

TRUSSES.

We have lately invented and tried a Truss made of a new composition spring metal. This metal will not rust, corrode or lose its spring, its mechanical construction is such that from a slight touch, to a hard push can be secured from the same Truss. Another peculiarity is a pad in which the bulge is flattened or pointed by a simple screw. This Truss is perfectly water and perspiration proof. We make a first class quality of Shoulder Braces, and can furnish every variety of apparatus applicable to faults of form or weakness, of the best quality on short notice.

The following are a few of the many letters we have received and not copied before, but all of which are some class of the before spoken of cases.

DELPHI, IND., *April 18th, 1866.*

Messrs. KIMBALL & CO.,

GENTS:

I received my Artificial Leg some time since, I just go right along on it without a stick or anything to help me. It is no use for me to thank you. I cannot tell under what obligations I feel to you, besides what I have paid you, for money is nothing where we can have the loss of a limb supplied as well as your limb does it. I would not do without mine now for a considerable sum, I think I will save the cost of it in a year in clothing. I feel so much delighted in having my deficiency so well supplied, I can scarcely express my feelings. Go on in your good work, may prosperity attend you

is my prayer. I have seen the gentleman who wore the first one of your legs I ever saw, he said his limb was all right yet, he walked first-rate. You may rest assured nothing will give me more pleasure than to do all I can for you. I often see men with the old fashioned wooden concerns hobbling along, I can tell as soon as I see them that all is not right. I saw a man a few days since using an old wooden peg, he stated he had tried one of the Palmer limbs but it hurt him so he could not use it, I asked him if he ever used one of yours, he said not; I asked him how long he thought I had been using mine, he guessed about a year, and was surprised when I told him I had been using it only a little over one-fourth of that time, and when I informed him where I was hurt, and where my limb was amputated, (above the knee) and how tender my stump was, and that my Artificial never gave me any pain or hurt me in the least, he gave it up and said if he could ever use a limb it was one of yours. There are other instances of the same kind, they all give it up when I explain the great merits of your limb. If you have a good supply of circulars you may send me some and I will distribute them for you. Any time when you wish to use me as a reference, I shall be happy to render you all the assistance in my power. Go on good and faithful servants until you are called up higher, until your labors are over where we will all have limbs, not artificial, but as the Maker made them. With my well wishes and greatest desire for your future success, I bid you good bye.

W. L. ATON, Telegrapher.

INDIANAPOLIS, IND., *Sept. 5th*, 1867.

Messrs. KIMBALL & CO.,

GENTS:—It is now two years since I commenced wearing one of your "Hard Rubber Limbs." I examined all other patents before looking at yours, but as soon as I saw yours, I was convinced that it was just what I wanted, and now after two years wear find I have not been disappointed. I think it the most durable and less likely to get out of order, and in case it should, it is so simple in construction that the wearer can put it in order again. I have put mine to some severe tests and find it does not chafe or gail the stump like most other limbs where they are used in thigh amputations. Several of my friends since seeing mine have procured one of your limbs and are well satisfied that they are the best limbs in use.

Truly Yours, G. B. COOK.

HARRISBURG, PA., *Jan. 3d*, 1867.

Messrs. KIMBALL & CO.,

DEAR SIRS:

Please send me some elastic for my Artificial Leg. At present my leg is doing admirably, I am walking all the time on it without the assistance of crutch or cane. I just think I can walk with anybody that uses Artificial Legs in the United States or any other States. Please forward the above as soon as convenient, and oblige,

Yours,

A. C. SWOPE.

532 BROADWAY, NEW YORK, *October 15th*, 1865.

Messrs. KIMBALL & CO.,

DEAR SIRS:

I am happy to inform you that I am very much pleased with the leg you furnished me, and with considerable experience with other than your Arti-

ficial Legs, I am glad to inform you, wherein I consider yours an improvement in my case. I unfortunately have a very tender stump, and it is impossible for me to wear with comfort any socket except the admirably fitting one made on your plan of taking cast of stump. I consider that the manner in which you dispense with and supply the place of the old "heel cord" of other makes, makes it a complete success. The suspended upper socket and the manner of fastening it to the leg and your corrugated noiseless side-joint recommends itself to any one who has been annoyed by constant "click, click" at every step, as is sure to be the case with the side-joints of other makers after very little wear. The imperviousness of the material, its lightness and the beauty of the limb, show their own recommendation at sight. In conclusion allow me to add that I consider your limb superior in all points to those of any other maker, and shall be happy to answer any enquiries concerning the limb. I do heartily recommend them to all who desire a comfortable, light, durable and elegant limb.

Yours, &c., T. C. KENDALL,
Late Capt. V. R. C.

WEISS PORT, CARBON CO., PA., *October 15th, 1865.*

Messrs. KIMBALL & CO.,

DEAR SIRs:

Will you be so kind as to send me another pair of straps. The ones you furnished are getting somewhat worn and I want another pair on hand.

I have to say to you that I am perfectly satisfied with the leg; am sure that no limb maker can do better for me. I have thrown away my cane and can walk as well as you or any other man. I cannot express my thanks to you for making me whole again, &c.,

Yours, Truly, JOHN KROMER.

MONTPELIER, VT., *March 23d, 1866.*

Messrs. KIMBALL & CO.,

DEAR SIRs:

The rubber socket you fitted into my old Palmer leg is a great improvement, I am able to wear it all the time now with perfect ease and work every day. If you give me as good a fit with the new leg I shall advise every unfortunate man who is obliged to wear an Artificial Leg, to throw away their wooden legs and get one of your Vulcanite Rubber Limbs.

Yours, respectfully, L. H. GOODRICH.

Messrs. KIMBALL & CO., No.—ARCH ST.,
PHILAD'A., *July 11th, 1867.*

Philadelphia.

GENTLEMEN:

Having ordered one of your celebrated Arms over two years ago, and since that time having been able to wear it and have it in constant use, I would beg leave to say to the public generally, and more especially to those who are similarly situated to myself, and are looking for something to take the place of nature in the way of Artificial Limbs:

First, your limbs being manufactured of Vulcanite Rubber they possess qualities which none other can, that is, strength in comparison with weight,

they being much lighter than any other limb I have been able to find, besides being made of that material can be much more readily fitted to the part than wood or any other substance now in use.

Second, the construction of your limbs is far superior to any others I have ever seen, both for durability and natural motion where they extend above the elbow joint, as mine does, they also possess motive power far superior to any that I know of now before the public, the muscles of the fingers, hand and arm, all being made of a material that is substantial and not liable to get out of order. Many of the limbs now manufactured and used contain cords which in a little while wear out, besides they are very much affected by the weather or damp atmosphere, it causing them to stretch, so that they cannot be used at times. I have no hesitancy in saying that I think the motive power of the KIMBALL & Co., Arm is superior to any now in use, believing that it cannot be made more substantial, nor to work with more dexterity. Having used my arm now constantly for over two years I have been obliged to have but very little repairs done and it is now as good and as strong as when I got it, and I would strongly recommend all who are in search of Artificial limbs to call on Messrs KIMBALL & Co., and examine their limbs and material before leaving orders elsewhere, as many have done and no doubt much to their regret, as many have got limbs to my knowledge which were of little or no use in their business, and in many instances could not wear them at all.

Men have been made to walk by KIMBALL & Co., when others failed to do them any good in the least. I could point out many other qualities which the *Vulcanite Rubber* limb possess but I do not deem it necessary. Any who may wish to call and examine their specimens will not fail to see that I have not done them justice. Knowing as I do that there are many others who wish to lay before the public, a recommendation, I will not consume too much space, but remain, Yours, respectfully,

A. G. RAPP, Philad'a, Pa.

FREEBURG, PA., July 2d, 1866.

Messrs. KIMBALL & CO.,

GENTS:

I am very well pleased with the arm you made. I can write my name with it although my arm was amputated above the elbow.

Yours, &c., WM. P. MOYER.

Warnersville, Schoharie County, N. Y., October 3d, 1864.

Messrs KIMBALL & LAWRENCE,

SIRS:—I lost my arm in the United States Service, and was so fortunate as to secure one of your unapproachable Hard Rubber Arms, and I feel it my duty to tender to you my thanks, and at the same time speak a word for the benefit of those in need of Artificial Limbs. I examined quite a number of patents before hearing of yours, and in all cases concluded I should rather be without any, they all being too *heavy*—too *clubby*—too *tender*, none of which could endure a short exposure to rain or moisture. A friend advised me to examine your limbs, which I did at the first opportunity, and was so pleased with their lightness and beauty, that I ordered one immediately. I have worn it ten months in all kinds of weather, and kept it constantly in use, and it is as perfect every way as when I obtained it, and so much a part of myself has it become, that I cannot endure to be an hour without it.

Thankfully yours,

C. M. BUTTERFIELD.

WARNERSVILLE, SCHOHARIE COUNTY, N. Y., *October 18th, 1865.*

Messrs. KIMBALL & CO.,

DEAR SIR:

I write to ask a favor of you. Can you find me a job in Philadelphia? My Artificial Arm is all right. There is nothing in this country or any other like it.

Yours, &c.,

CHARLES M. BUTTERFIELD.

CAVENDISH, VERMONT, *October 10th, 1865.*

Messrs. KIMBALL & CO.,

DEAR SIR:

Perhaps you remember putting an Arm on a Vermont Soldier last year. I write to show you how I can write with it, and I just want to tell you that I can beat any live man using an Artificial Arm. I can pick up a pin and stick in my eye. Play toss and catch as well as you, and write like this.

Dennis O'Connor

Messrs. KIMBALL & CO.,

GENTLEMEN:—I lost my arm in the service of the United States, and was supplied by B. F. Palmer, (for Government,) I was told that it would be of some use to me, that I could use the fingers, &c. But judge of my surprise when I received the arm to find the hand and fingers to be one solid block of wood without the semblance of a joint. (I do not pretend to say that he cannot make a hand with fingers to work, but I do say, that the work that he and other wooden-limb makers turn off on the soldiers is an imposition both on soldier and Government.) I was obliged to take the arm but wore it but one day, when passing down Arch Street, Philadelphia, I saw Vulcanite Rubber Limbs and ordered one; have worn it some time, can work the fingers in every position, and am well satisfied it is the best of artificials.

You may use this for the benefit of those in want of what I wanted and have found: the best artificial limb to be had.

BURTON CARL.

Please take note that all the following certificates bear very late date, and if the manufacturers of old style of limbs have certificates from the same, by the date we prove that we have made improvements in Artificial Limbs.

NEW YORK, *August 26th, 1865.*

Messrs. KIMBALL & CO.,

DEAR SIR:

I have carefully examined an Artificial Leg and Arm made by Mr. H. A. KIMBALL, and consider that they present many advantages over the Artificial Limbs now in use.

The material of which they are made, Vulcanized India Rubber possesses all the qualities requisite for a useful and durable Limb. The mechanism

seems to be as perfect as any Artificial Limb now in use. Having had numerous opportunities of testing the advantages of Vulcanized India Rubber in Surgical Appliances, I cheerfully recommend it.

ALEX. B. MOTT, M. D.

Professor of Surg'l Anat. in B. H. Med. Col.; Bre't Lt. Col.

Surg. U. S. Vols.

No. 1104 ARCH ST., PHILADELPHIA, August 26th, 1865.

Messrs. KIMBALL & CO.,

DEAR SIRs:

After having had extensive opportunities of practically testing the comparative merits of the different Artificial Limbs now before the public, I am convinced that those made by Messrs. KIMBALL & Co. present the greatest advantages, being exceedingly light, ingenious in construction, efficient in use and durable.

RICHARD J. LEWIS.

NEW YORK, August 19th, 1865.

Messrs KIMBALL & CO.,

DEAR SIRs:

I have carefully examined KIMBALL's Patent Vulcanite Rubber Artificial Limbs, and unhesitatingly pronounce them the best which I have seen. For simplicity of mechanical arrangement, for lightness and facility of adaptation to the stump, I do not see how they could be excelled, and I am only surprised that the material of which they are made should not at an earlier date have attracted the attention of mechanical inventors, as well for the manufacture of Artificial Limbs as for every kind of Surgical Splint and Appliance. I heartily commend the invention.

I. I. HAYES.

Late Surgeon and Bre't Lt. Col. U. S. Vols.

64 MADISON AVENUE, NEW YORK, August 30th, 1865.

Messrs. KIMBALL & CO.,

DEAR SIRs:

I have examined the Artificial Limbs, Arms and Legs constructed by H. A. KIMBALL of Philadelphia, and take pleasure in saying that they seem to possess many points of excellence and some points of actual superiority; and while it might not be proper for me to affirm that they are better than all similar contrivances, I feel quite certain and desire to say, that they are equal to any which have come under my notice.

FRANK H. HAMILTON,

Prof. of Military Surgery in Bellevue Med. Col.; Surgeon of Bellevue Hospital, late Medical Inspector of the U. S. Army.

DR. WILDMAN, Professor of Mechanical Dentistry, in the Philadelphia Dental College, and whose practical knowledge of the nature of Vulcanized Rubber is equal to any in the land, writes thus:

Messrs. KIMBALL & LAWRENCE,

DEAR SIRs:

I am pleased to learn that you have adopted the use of Vulcanite or Hard Rubber, in the manufacture of Artificial Limbs. For strength, durability, lightness and cabability of fine finish it is vastly superior to any material heretofore used for such purposes.

E. WILDMAN, M. D.

DR. BUCKINGHAM, of the same, writes thus:

PHILADELPHIA, *August 28th, 1865.*

I have seen some Artificial Limbs made by H. A. KIMBALL & Co., that excel any I have examined. The material of which they are made, Vulcanized India Rubber, is certainly the best that can be used for the purposes; it combines strength with lightness and durability, and is not acted on by any of the secretions of the body, nor any other fluids it is likely to come in contact with, when used for this purpose. It can be moulded to any shape, and when Vulcanized will retain the form given it. This substance has been extensively used for the last five years to mount Artificial teeth, and where it is exposed more to the action of secretions, the changes of temperature and mechanical power in mastication, than it could be in any other use to which it can be applied, and so far there has been no serious fault found with it. Vulcanite Rubber can also be used for making splints and other Surgical appliances, for which it is superior to any other substance now in use.

T. S. BUCKINGHAM, D. D. S.

Professor of Chemistry in Pennsylvania Dental Col.

No. 14 EAST SIXTEENTH STREET, NEW YORK, *August 22d, 1865.*

I have examined an Artificial Arm made of Vulcanite India Rubber by Mr. Kimball of Philadelphia, the Arm itself from the facility of its movements, and the neatness of its appearance seems to be well adapted to the purpose of supplying the defect caused by the loss of the original member.

I have also seen an Artificial Leg made of the same material which is equally worthy of commendation.

The substitution of Vulcanized India Rubber for the other substance generally used in the construction of Artificial Limbs, appears to me to be an invention likely to be of much service and comfort to those who are so unfortunate as to require the inventions of art to supply the place of the lost natural member.

I am disposed to believe that Vulcanite Rubber will also prove useful for many of the appliances of surgery, such as for splints required in fractures of the extremities, lower jaw, &c.

J. M. CARNOCHAN, M. D., *Surgeon in Chief to the State Hospital, &c.*

SLOAN U. S. GEN. HOSPITAL, MONTPELIER, VT., *July 23d, 1865.*
Messrs. KIMBALL & CO.,

DEAR SIRs:

I have the honor to inform you that we have had several trials of your Artificial Limbs here. In every instance they have proved perfect successes, and I would most respectfully recommend them to the public as one of the greatest inventions of the age. Respectfully, yours,

J. B. CRANDALL, *A. A. Surgeon in charge.*

U. S. A. GEN. HOSPITAL, CHESTNUT HILL, *June, 1865.*

Messrs. KIMBALL & CO.,

DEAR SIRs:

I have examined the appliances made by you for my brother,———
Hopkinson, and have had opportunities of seeing other varieties of your
work, and I take pleasure in pronouncing them the best I have seen.

Dr. ALEXANDER HOPKINSON,

Surgeon of U. S. A. in charge.

WALNUT STREET, PHILADELPHIA, 1865.

I take pleasure in recommending the exceedingly ingenious and simple
mechanical appliances, Artificial Limbs, &c., made by Kimball & Co., 639
Arch Street, Philadelphia: they far excel any I have seen.

Dr. S. WEIR MITCHELL,

Late Surgeon in charge of U. S. Gen. Hospital, Turner's Lane.

162 WEST 34TH ST., NEW YORK, *August 20th, 1865.*

I have carefully examined the Artificial Legs and Hands manufactured
by Mr. H. A. Kimball. I regard them as most admirably adapted for the
purpose intended. The hand is especially worthy of commendation. The
material of which these limbs are constructed (Vulcanized India Rubber)
is certainly preferable to any with which I am acquainted.

WILLIAM H. HAMMOND, M. D.

PHILADELPHIA, *October 20th, 1864.*

I have examined the Artificial Limbs constructed by Kimball & Co.,
and have no hesitation in saying that for simplicity, lightness, durability
and artistic elegance, they have no superiors.

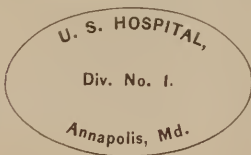
D. HAYS AGNEW, M. D.

U. S. HOSPITAL, ANNAPOLIS, MD., *October 21st, 1864.*

I corroborate the above statement.

R. VANDERKIEF,

Surgeon U. S. Vol., in charge.



U. S. GOV. HOSPITAL, EMORY, *Washington, D. C., Nov. 3d. 1864.*

I fully concur in the above statement.

N. N. MOSELY, *Surgeon U. S. Vols., in charge.*

U. S. GEN. HOSPITAL, TURNER'S LANE, PHILADELPHIA, 1865.

DEAR SIR:—With great pleasure I am able to state that I have carefully examined your Exterior Mechanical Appliances and Limbs in general, and find them superior to anything of the kind heretofore examined by me.

Very respectfully, your Ob't Serv't,

ROBERT A. CHRISTIAN, *Surgeon U. S. A., in charge.*

PHILADELPHIA, *Feb., 22d, 1865.*

I have examined with care the Artificial Limbs made by Messrs. Kimball & Co., have seen their practical use, and am of the opinion that they are fully equal to any now in use. Very respectfully.

S. D. GROSS, M. D., *Prof. Surg. in Jefferson Med. Col.*

1604 WALLACE STREET, PHILADELPHIA, *November 2, 1865.*

GENTLEMEN:—After a careful and to me very interesting examination of the Artificial Limbs made in your factory, I believe them to be superior to any that have ever come under my notice. The beautiful and easy working of their mechanism, their lightness and great strength, stamp them as unrivalled.

Your Philanthropic resolve to bring them, in a point of price, within the reach of our disabled soldiers, should particularly recommend them to notice.

Yours truly,

R. TROUBAT, M. D.

MESSRS. KIMBALL & Co.

NOTE.

It will be noticed that the above list includes the very best authority in the United States, who have been surgeons in charge of the largest Military Hospitals in the world during the late war and whose opportunity of seeing and comparing the various Limbs furnished by the Government with ours has been unlimited, and whose hearty approval as above, gives proof of what we claim, as aforesaid.

KIMBALL & Co.

ARTIFICIAL
LIMBS

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